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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,022	01/29/2004	Yoji Nakatani	501.43385X00	2664

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MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.
1800 DIAGONAL ROAD
SUITE 370
ALEXANDRIA, VA 22314

EXAMINER

DILLER, JESSE DAVID

ART UNIT	PAPER NUMBER
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2187

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/766,022

Applicant(s)

NAKATANI ET AL.

Examiner

Jesse Diller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-5, 7-10 and 12-15 is/are allowed.
- 6) ☒ Claim(s) 1, 6, 11 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

1. Examiner acknowledges receipt of the amendment in response to the office action dated 03/21/2006, which amendment was received 06/21/2006. At this point, claims 1, 6, 8, and 11 have been amended. Claims 1-16 are pending in the application.

Response to Arguments

2. In response to amendment, the 35 USC § 112 rejection of claim 6 is withdrawn.

Response to Arguments

3. **Applicant's arguments filed with respect to the 35 USC § 102 rejections of claims 1, 6, 11, and 16 by Srinivasan have been fully considered, but are not persuasive.**
4. Applicants claim that the reference does not teach the limitation added by amendment, namely the cache monitoring by the file systems. However, see the rejections below, which explain the rationale for concluding that the prior art does in fact teach this step.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claims 1, 6, 11, and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Srinivasan et al., US 6,823,336.**

6. **As for claim 1, Srinivasan teaches**

- A storage system comprising:
 - a disk system having:
 - at least one disk to store data (26, 28, Fig. 1);
 - a disk control unit to control writing and reading of data to and from said at least one disk (25, 27, Fig. 1); and
 - a disk cache for transmitting and receiving data to and from said at least one disk (145-148, Fig. 9);
- a file server, connected to said disk system (i.e., 111, Fig. 8; 181, Fig. 13) including
 - a Central Processing Unit (CPU) and a main memory to store programs and data for said CPU (inherent in data mover 111, Fig. 8. see, for instance, Col. 5, lines 30-35, which incorporate by reference Ofek, US

5,893,140 as a description of the hardware in the system. Col. 4, lines 39-65 of Ofek, discusses a detailed view of the data mover, which Srinivasan shows as 111, Fig. 8),

- a network interface to be coupled to clients through a network (Col. 17, lines 35-65);
- interfaces for sending and receiving data to and from other storage systems through a communication link (22, Fig. 1);
- wherein said main memory includes
 - a file system-processing unit managing storage areas of said at least one disk, so that files are correlated with data locations on said at least one disk (116-117, Fig. 9; see also 191-193, 201-203, Fig. 13), and
 - a file-system cache to be used by said file system-processing unit (see 194, 204, Fig. 13);
- wherein said disk control unit receives data of a file that has been updated in another storage system and a history of file-management information from another disk system through said communication link (see Figs. 10-11; the delta sets received are combinations of the data and metadata; Col. 11, lines 20-60) without using another file server connected to said another disk system of said another storage system (see Fig. 9; server 111 of storage system 23, Fig. 1 is not used to store data in 142) and stores the received data of a file and the history of file-management information on the disk cache of the system (147-148, Fig. 9), and

- wherein said file server monitors the history of the file-management information on the disk cache of the disk system and updates file-management information in said file-system cache in the main memory of the storage system in accordance with the update of the file performed in said another storage system if a change in the history of the file management information on the disk cache of the disk system of said storage system has occurred. (Col. 12, lines 1-35; both filesystems 116-117 are active, Col. 15, lines 38-40, 55-67; therefore, when the data updates in the caches 145-148 are applied to the disks 141-142, the other filesystem must be updated with the metadata from the caches. For this to happen, the file servers 111, 114 must inherently monitor the caches, or outdated data will be accessed).

7. As for claim 16, Srinivasan further teaches:

- when said disk-control unit receives a read request from a client coupled to the storage system, the storage system refers to the file-management information updated in said file-system cache and reads from the disk, the contents of the updated file and transfers the contents to said client (see Col. 17, lines 13-24; also see read data, 143-134, Fig. 9).

8. As for claim 6, Srinivasan teaches a file reference method of a storage system, said storage system which includes:

- a disk system having:
 - at least one disk to store data (26, 28, Fig. 1);

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- a disk control unit to control writing and reading of data to and from said at least one disk (25, 27, Fig. 1); and
 - a disk cache for transmitting and receiving data to and from said at least one disk (145-148, Fig. 9);
- a file server, connected to said disk system (i.e., 111, Fig. 8; 181, Fig. 13) including
 - a Central Processing Unit (CPU) and a main memory to store programs and data for said CPU (inherent in data mover 111, Fig. 8. see, for instance, Col. 5, lines 30-35, which incorporate by reference Ofek, US 5,893,140 as a description of the hardware in the system. Col. 4, lines 39-65 of Ofek, discusses a detailed view of the data mover, which Srinivasan shows as 111, Fig. 8),
 - a network interface to be coupled to clients through a network (Col. 17, lines 35-65);
- interfaces for sending and receiving data to and from other storage systems through a communication link (22, Fig. 1);
- wherein said main memory includes
 - a file system-processing unit managing storage areas of said at least one disk, so that files are correlated with data locations on said at least one disk (116-117, Fig. 9; see also 191-193, 201-203, Fig. 13), and
 - a file-system cache to be used by said file system-processing unit (see 194, 204, Fig. 13);

- said FS processing unit and cache being part of a file server connected to at least one disk
- said file-reference method comprising;
 - a storing step in which said disk-control unit receives contents of a file that has been updated in another storage system (see “write data”, Fig. 9) and a history of file- management information through said communication link from said other storage system (22, Fig. 1) and stores the contents of a file and the history of file- management information on the disk cache of said storage system (see Fig. 9; the secondary data storage system receives “delta chunks” which include both the data of the file changed in the other storage system and metadata for the filesystem update, which chunks are stored in the cache 147-148; Col. 11, lines 20-60; see also Col. 16, line 65 to Col. 17, line 3) without using another file server connected to said another disk system (see Fig. 9; server 111 is not used to store data in 113);
 - a monitoring step in which said file server monitors the history of the file- management information stored in said disk (see, for instance, Col. 15, lines 1-15; Col. 15, lines 42-57; some form of monitoring is inherent in this update process, as the file system clearly uses the metadata received from the other storage system to update the filesystem; therefore, it must refer to said metadata, which reads on the referring step. Also, as both

filesystems 116-117 are active, the file servers 111, 114 must inherently monitor the caches, or outdated data will be accessed);

- an updating step in which, based on monitoring the history of the file-management information, said file server updates the file-management information in said file-system cache in accordance with the update of the file in said other storage system if a change in the history of the file management information on the disk cache of the disk system of said storage system has occurred. (Col. 12, lines 1-35; both filesystems 116-117 are active, Col. 15, lines 38-40, 55-67; therefore, when the data updates in the caches 145-148 are applied to the disks 141-142, the other filesystem must be updated with the metadata from the caches; see also Col. 17, lines 1-3; the stored data is “replayed” to update the filesystem); and
- a transfer step in which, when said disk-control unit receives a read request from a client coupled to the storage system, the storage system refers to the file-management information updated in said file-system cache and reads from the disk, the contents of the updated file and transfers the contents to said client (see Col. 17, lines 13-24; also see read data, 143-134, Fig. 9).

9. **As for claim 11, Srinivasan teaches a network system comprising**

- a first storage system and a second storage system (110, 113, Fig. 9), wherein each storage system comprises:
 - a disk system having:
 - at least one disk to store data (26, 28, Fig. 1);
 - a disk control unit to control writing and reading of data to and from said at least one disk (25, 27, Fig. 1); and
 - a disk cache for transmitting and receiving data to and from said at least one disk (145-148, Fig. 9);
- a file server, connected to said disk system (i.e., 111, Fig. 8; 181, Fig. 13) including
 - a Central Processing Unit (CPU) and a main memory to store programs and data for said CPU (inherent in data mover 111, Fig. 8. See, for instance, Col. 5, lines 30-35, which incorporate by reference Ofek, US 5,893,140 as a description of the hardware in the system. Col. 4, lines 39-65 of Ofek, discusses a detailed view of the data mover, which Srinivasan shows as 111, Fig. 8),
 - a network interface to be coupled to clients through a network (Col. 17, lines 35-65);
- interfaces for sending and receiving data to and from other storage systems through a communication link (22, Fig. 1);
- wherein each main memory of the first and second storage systems includes

- a file system-processing unit managing storage areas of said at least one disk, so that files are correlated with data locations on said at least one disk (116-117, Fig. 9; see also 191-193, 201-203, Fig. 13), and
 - a file-system cache to be used by said file system-processing unit (see 194, 204, Fig. 13);
- wherein the disk-control unit of said first storage system receives contents of a file that has been updated in the second storage system (see “write data”, Fig. 9) and a history of file- management information through said communication link (22, Fig. 1) without using the second file server connected to said second disk system (see Fig. 9; server 111 is not used to store data in 142) and stores the contents of a file and the history of file- management information on a disk (see Fig. 9; the secondary data storage system receives “delta chunks” which include both the data of the file changed in the other storage system and metadata for the filesystem update; Col. 11, lines 20-60; see also Col. 16, line 65 to Col. 17, line 3);
- wherein the file server of said first storage system refers to the history of the file- management information on the disk (see, for instance, Col. 15, lines 1-15; Col. 15, lines 42-57; some form of referrance is inherent in this update process, as the file system clearly uses the metadata received from the other storage system to update the filesystem; therefore, it must refer to said metadata, which reads on the referring step) and updates the file- management information in the file- system cache of said first storage system in accordance with the update of the

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file in said second storage system (Col. 12, lines 1-35; both filesystems 116-117 are active, Col. 15, lines 38-40, 55-67; therefore, when the data updates in the caches 145-148 are applied to the disks 141-142, the other filesystem must be updated with the metadata from the caches; see also Col. 17, lines 1-3; the stored data is "replayed" to update the filesystem); and

- wherein, when said first storage system receives a read request from a client, said first storage system refers to the file-management information updated in said file-system cache reads, from the disk, the contents of the update file received from said second storage system, and transfers the contents to said client (see Col. 17, lines 13-24; also see read data, 143-134, Fig. 9).

Allowable Subject Matter

Claims 2-5, 7-10, 12-15 are allowed. The reasons for allowance for these claims may be found in a prior action.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse Diller whose telephone number is (571) 272-4173. The examiner can normally be reached on 9:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



JD



Brian R. Peugh
Primary Examiner